ST PERSPECTIVE

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SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

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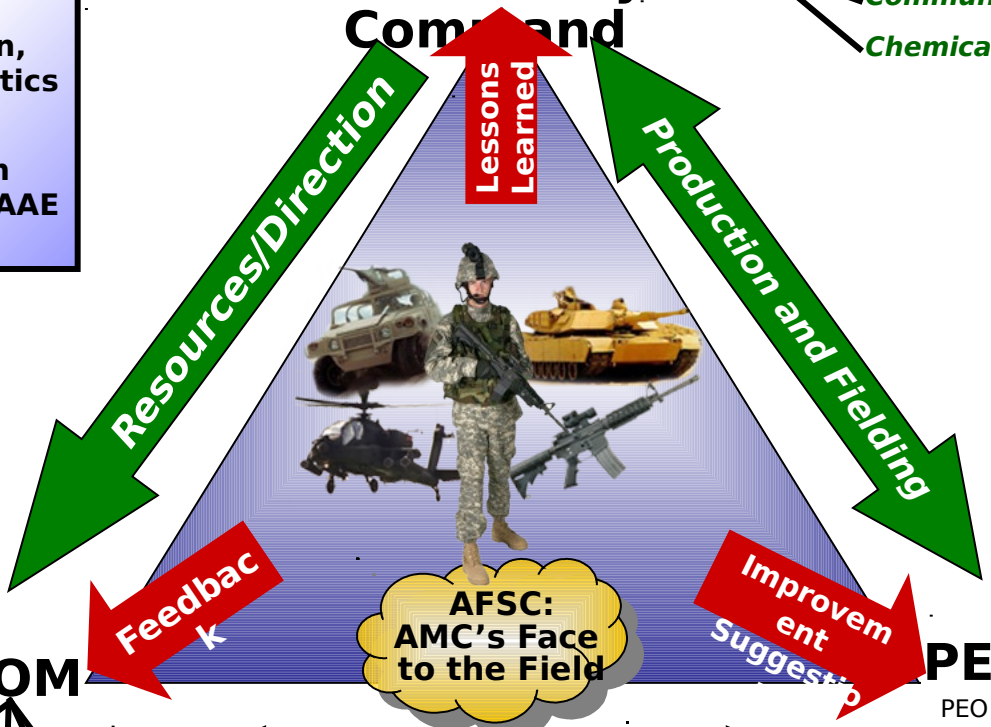
Lifecycle Management Commands: Uniting the Effort

- Unity of effort between Acquisition, Research and Logistics communities
- Acquisition decision authority between AAE and PEO's not affected.

AMC Commodity Command

- *Tank – automotive and Armaments Comm*
- *Aviation and Missile Command*
- *Communications – Electronics Command*
- *Chemical Materials Agency*



RDECOM

- TARDEC
- AMRDEC
- CERDEC
- ARDEC

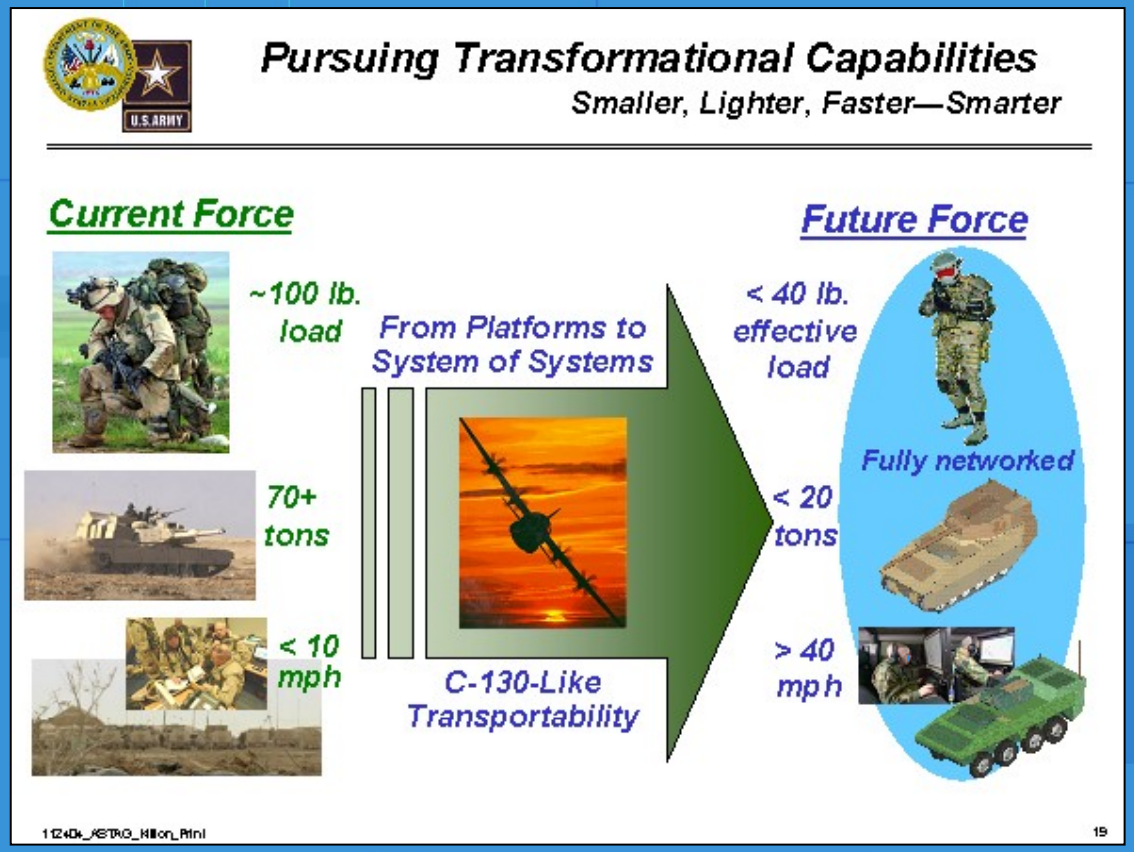
PEO/PM

PEO Soldier
PEO Ground Combat Systems
PEO Combat Support & Combat Service Support
PEO Missiles and Space
PEO Aviation
PEO Intelligence, Electronic Warfare, and Sensors
PEO Command, Control, and Communications (Tactical)

Army S&T Mission

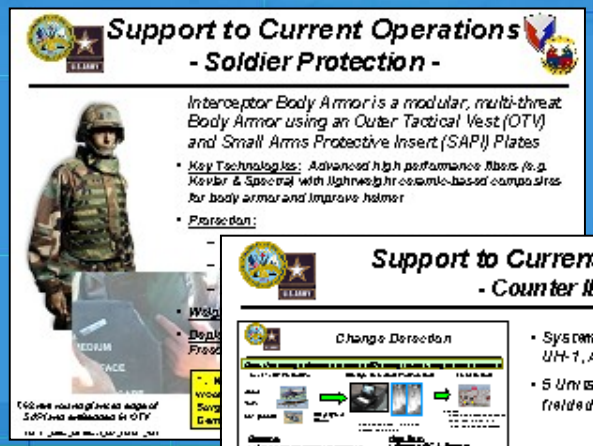
SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

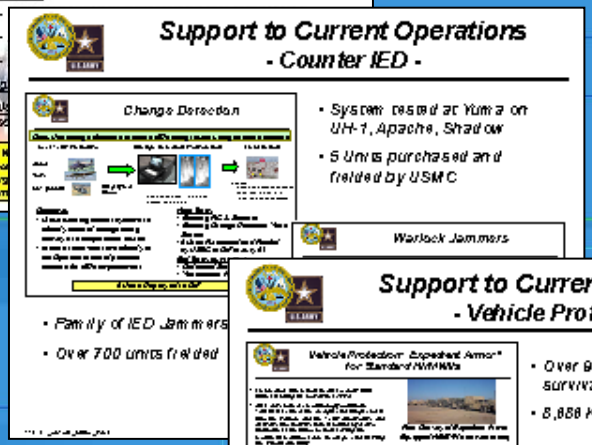
Foster innovation and accelerate and mature technology to enable Future Force capabilities and exploit opportunities to transition technology for the Current Force

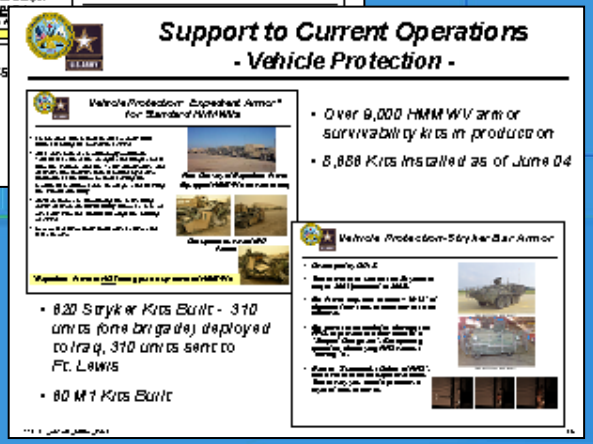


Enhancing the Current Force

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY


Support to Current Operations
- Soldier Protection -
Interceptor Body Armor is a modular, multi-threat Body Armor using an Outer Tactical Vest (OTV) and Small Arms Protective Insert (SAPI) Plates
Key Technologies: Advanced high performance fibers (e.g. Kevlar & Spectra) with lightweight ceramic-based composites for body armor and improve helmet
Protection:


Support to Current Operations
- Counter IED -
Change Detection
System tested at Yuma on UH-1, Apache, Shadow
5 Units purchased and fielded by USMC
Warlock Jammers
Family of IED Jammers
Over 700 units fielded


Support to Current Operations
- Vehicle Protection -
Vehicle Protection: Expedient Armor for Standard HMMWVs
Over 9,000 HMMWV armor survivability kits in production
8,868 Kits installed as of June 04
Vehicle Protection-Stryker Bar Armor
820 Stryker Kits Built - 310 units (one brigade) deployed to Iraq, 310 units sent to Ft. Lewis
80 M1 Kits Built

Benefiting from past investments

Exploiting on-going programs

Leveraging S&E expertise

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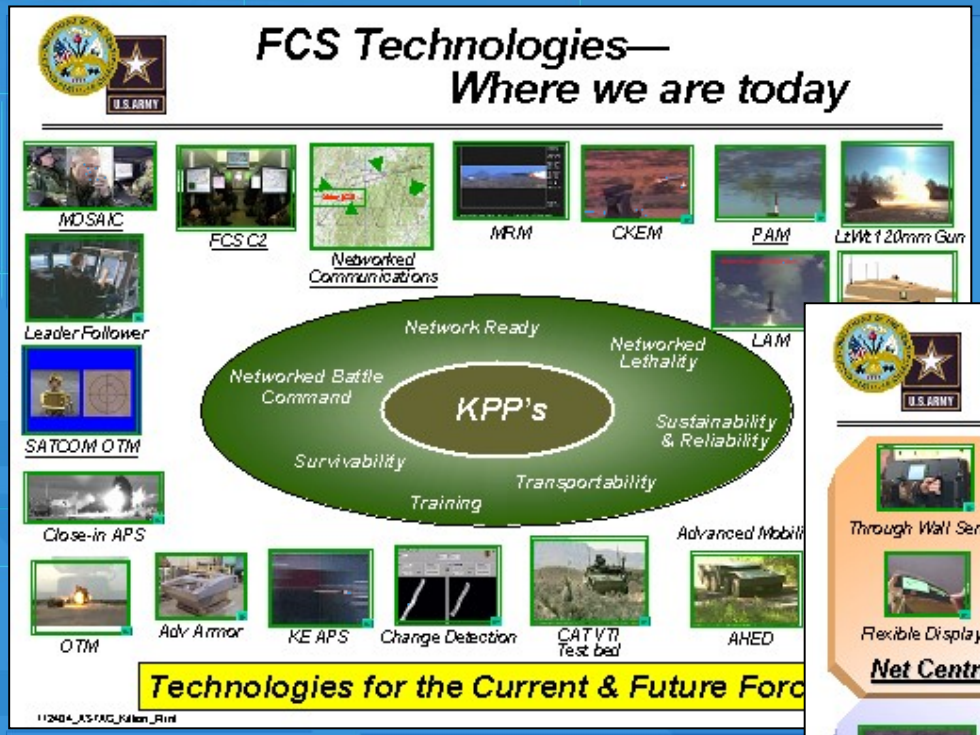
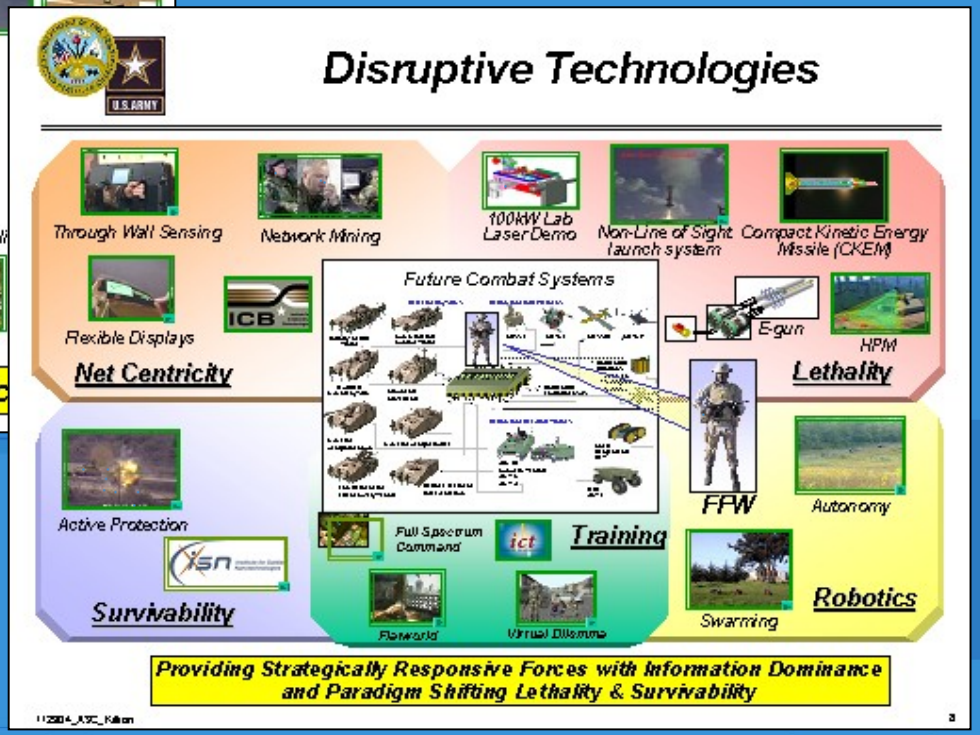
Enabling the Future Force

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY





Planned Goals and Objectives

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- Ensure Army Research is
  - focused on areas that support Warfighter needs, the Army's vision and Transformation Plan
  - of high quality and technically relevant

- Maximize use of available funds
  - Attract and retain highest quality personnel
  - Support efforts to provide state-of-the-art S&T laboratories and centers

Provide guidance that creates a future abundant with relevant opportunities

Representative S&T Goals

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- **Maintaining / Enhancing Army S&T Budget**
- **Achieve Balance of Technology**
  - **Innovation versus Risk**
- **Enhanced Leveraging Through Army / Industry / Academia Partnerships**

Background Army Structure

- Protocol / Pay Equivalent to SES
- Currently 42 Army ST Positions
  (Approximately 100 STs Throughout DOD)
- Army Vision to Assure Quality Technical Talent

ST Characteristics

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- WORLD CLASS EXPERTS IN A VARIETY OF TECHNICAL FIELDS
- PROACTIVE TECHNICAL TASKS/INPUTS (HEADQUARTERS DA/DOD)
- TECHNICAL S&T LEADERSHIP (ORGANIZATIONALLY)
- SCIENTIST MENTORSHIP / NURTURING / RECRUITMENT
- ACTIVE IN SPECIFIC TECHNICAL COMMUNITIES
- PROVIDE TECHNICAL CREDIBILITY OVER BROAD RANGE OF S&T AREAS

Army ST Organization – Value Added

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- IMPROVE EFFECTIVENESS OF ARMY S&T PROGRAM
- IMPROVE IMAGE / RECRUITMENT OF ARMY SCIENTISTS
- ENHANCE TECHNICAL SKILLS OF ARMY SCIENTISTS
- PROVIDE RESPONSIVE TECHNICAL COUNSEL TO ARMY ADMINISTRATORS
- PROVIDE INDEPENDENT “IN-HOUSE” SENIOR LEVEL TECHNICAL RESOURCE (i.e. “IN-HOUSE” EQUIVALENT TO ARMY SCIENCE BOARD)

Opportunities for ST Participation

- **ILIR**
  - Take leading role in developing program by ensuring:
    - high technical quality of ILIR
    - projects involve high risk basic research
    - relevant to fields of investigation
    - relevant to the Army
    - money is used to attract and mentor recent graduates with new knowledge
- **BRR**
  - Actively participate in evaluating, responding and implementing findings/recommendations
- **Portfolio Analysis**
  - Participate as “stakeholders”
  - Actively participate in implementing recommendations

Opportunities for ST Participation

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- **Army Educational Outreach**
  - Participate in mentoring programs
  - Serve as eCybermission Ambassadors
  - Serve as Cyber Guides
- **SBIR**
  - Encourage and facilitate SBIR-ATO linkage
- **Army Science Conference**
  - Participate in shaping the conference by providing input to themes, topical discussions and invited speakers

Small Business Innovation Research (SBIR)

- Army SBIR Program is $233.8M in FY05 – need to leverage these $$ to better support Army programs
- Increased emphasis on transition and linkage with Army Technology Objectives
- PMs/PEOs were allocated SBIR Topics this year for the first time – pilot program – need feedback
- Technology Area Chiefs' SBIR evaluations are critical

Future Reality

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

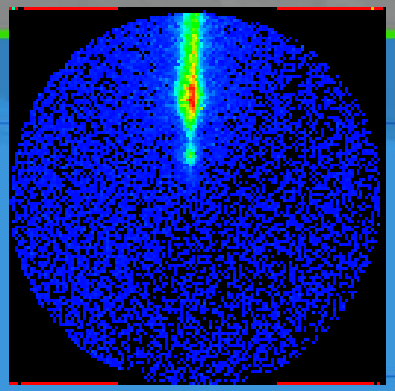
- LIMITED ARMY S&T FUNDS
- CONTINUING NEED FOR STATE-OF-THE-ART QUALITY PRODUCTS
- NEED FOR IMPROVED PREDICTIVE TOOLS
- ENHANCED LEVERAGING EMPHASIS NECESSARY
- CRITICAL NEED TO ATTRACT TOP ARMY TECHNICAL TALENT

What else is happening in S&T

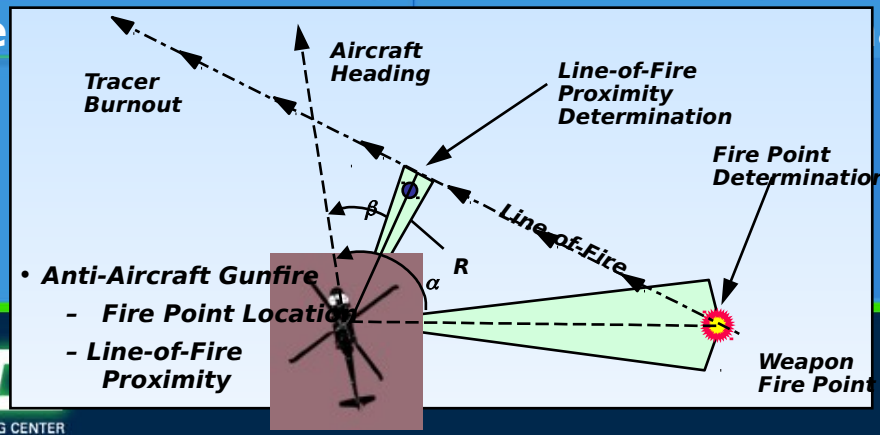
SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- Flexible Displays Center
- Venture Capital Transition—state of charge indicator
- Future Force Warrior and Land Warrior Integration
- Joint Heavy Lift
- Hindsight II
- Network Science ITA (UK)
- Hostile Fire Indications (UK)
- S&T Program Assessments

Hostile Fire Indications (HFI)



- Sep 04 test @ Redstone Arsenal
- Small Arms, 50 cal, RPGs
  - Ball rounds, tracers
- Data from UV CMWS and two-color IR
- Results:
  - Two color IR sensor saw muzzle flashes and tracers saw everything out to maximum range
  - UV sensors (CMWS) saw tracers and muzzle flashes from the larger weapons (had problems seeing muzzle flashes from smaller weapons)
  - CMWS saw tracers from all weapons
  - CMWS did not see [illegible] an 500m



What We Do

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

TARDEC Product Lines

TARDEC is responsible for engineering support to more than 2,800 Army systems and many of the Army's and DoD's top joint warfighter development programs:

- Combat and Tactical Vehicles
- Logistics Equipment
- Water Generation and Purificatio

- Fuels and Lubricant
- Military Bridging

- Fuel and Water Storage, Distribut and Quality Surveillance Equipment
- Countermine Equipment

TARDEC's Technology Thrusts

- Vehicle Survivability Systems
- Water Generation and Purification
- Unmanned Vehicle Developments
- Advanced Vehicle Concepts
- Fuel and Lubricant Research
- Crew Station Integration and Automa
- Software/Vetronics
- Next Generation Software
- Hybrid-Electric Power
- Propulsion
- Fuel Cells
- Collaborative Environments
- Physical Prototyping
- Advanced Materials
- Analytical and Physical Simulatio
- High Performance Computing

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National Automotive Center (NAC)

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- In the early 1990s, the TARDEC National Automotive Center (NAC) was formed at the Detroit Arsenal to leverage the world's greatest source of automotive technology – the Metro Detroit technology might located around the Detroit Arsenal.
- Dual-use projects with automotive industry bring millions of dollars into the Detroit Metro area.
- Focus: Hope, a Detroit civil and human rights organization, through its Center for Advanced Technologies, benefits greatly through dual-use partnership projects.
- Mobile Parts Hospital (MPH)
- Advanced Collaborative Environment (ACE)
- Advanced Hybrid Electric Drive (AHED) (8x8) to Future
- J19339 Data Bus
- M113 Hybrid

Mobile Parts Hospital

ACE

AHED 8x8

J1939 Data Bus

M113 Hybrid

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DUAL NEEDS FOCUS

SUPERIOR **TECHNOLOGY** FOR A SUPERIOR **ARMY**

MILITARY NEEDS

NAC

INDUSTRY NEEDS

<<< COOPERATIVE AGREEMENTS >>>

COLLABORATIVE ENVIRONMENT

<<< COMMON SPECIFICATIONS >>>

DUAL - USE

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TARDEC Support to Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF)

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- TARDEC is the “point of spear” for armoring tactical vehicles in Iraq.
- TARDEC is the only tactical vehicle armoring design house in the Army.
- Designed In-House Armor Kits:
  - HMMWV
  - M939
  - M915A0/A1 Line Haul Tractor
- Integration and Rapid Prototype of Armor Survivability Kits
- Testing and recommendations of industry Survivability Kits
- Installation Training in Iraq of HMMWV Survivability Kits
- Follow-on success of Armor in Bosnia, Haiti, Somalia
- The HMMWV Armor Survivability Kit Collaboration between the U.S. Army Research Lab and TARDEC is the 2004 Collaboration Team of the Year.
- Omni-directional robot deployment for improvised explosive device detection during vehicle searches
- Over 45 TARDEC employees deployed in support

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Facility Excellence – Unique Infrastructure
TARDEC Labs

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

Ground Vehicle Simulation Lab

MGS Stryker on Vehicle Inertial Properties Evaluation Rig (VIPER)

Ground Vehicle Simulation Lab

Turret Motion Simulator

Physical Prototyping Lab

HMMWV – Armor Survivability Kit

Water Purification Lab

Petroleum Lab

Propulsion Lab

Test Cell 9

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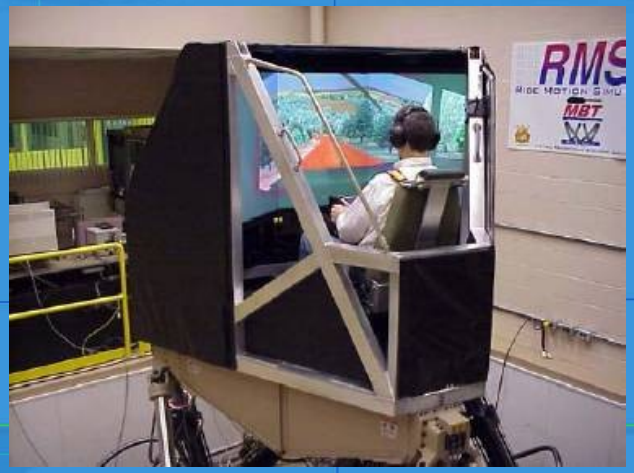
Facility Excellence – Unique Infrastructure
TARDEC Labs

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

ew Station Systems & Integration Lab

Crew Station

Ground Vehicle Simulation Lab

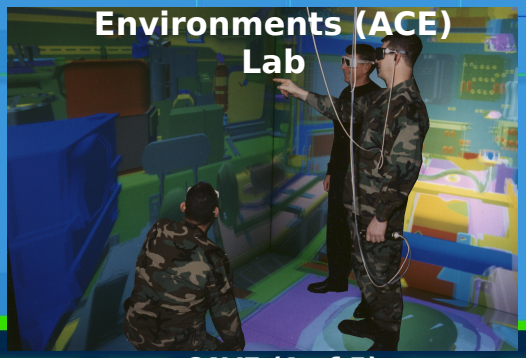


Ride Motion Simulator and Visualization System

Next Generation Software Lab

M1A2 System Integration Lab

Advanced Collaborative Environments (ACE) Lab



CAVE (1 of 5)

High Performance Computing Lab

Visual Perception Lab

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TARDEC/Selfridge Air National Guard Base (SANGB) Mission Integration

SANGB is an integral part of TARDEC

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

Dynamic Bridging Simulation Lab

- Capabilities include static and dynamic structural load application for structural strength and fatigue testing.
- 60’x200’ facility that features a state-of-the-art computer controlled load test area with automated data acquisition capability.
- Light fabrication shop on site.

Water Lab

- Test water purification components and systems using a natural source of water.
- Test product improvements for existing military water purification systems.
- Perform basic water quality analyses.
- Introduce and refresh training for military water treatment specialists and civilians.

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Educational Outreach Summary

Army Educational Outreach Program is designed to identify, grow and develop future generations of Army S&Es

Implementation by MACOMS will institutionalize the process to ensure success

Success means engaging, channeling and maintaining student participation in the program throughout their academic career

Engage and channel them

Summary

- Army S&T could be better positioned to address emerging technology trends

- Need to:
  - Increase levels of technical excellence and innovation in R & D programs
  - Increase the number of efforts working with “embryonic” technologies, while reducing the number of efforts involving “aging” and/or “mature” technologies
  - Accept greater levels of risk, commensurate with potential payoff

- Attract bright young minds to Army S &T

Creating the future through Discovery and Innovation for Full Spectrum Dominance